

Montana Department of Transportation



DOT HM-126F & OSHA Right to Know Mechanics Training Manual 1995

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General Awareness

1. Introduction

HM 126F training is required under Hazardous Materials Regulations. The purpose of the training is to develop safe work practices for those who work with hazardous materials.

Goal

Develop awareness of hazardous materials in the workplace, how to prevent accidents and incidents, and how to handle hazardous material incidents.

Objective

Participants will demonstrate awareness of how to find hazardous material information from materials safety data sheets, labels, placards, DOT hazardous material tables, shipping papers, and packaging.

Group Activity 1

In a small group-answer the following questions:

1. Make a list of hazard materials with which you work.
2. What haz mat accident could occur in you work area?
3. What would you do in case of a hazardous emergency in your work area?

Hazardous Materials

Hazardous materials are defined as materials which can pose an unreasonable risk to health and safety of people or property.

2. Department of Transportation Hazardous Materials Tables

The Hazardous Materials Table lists materials that the Research and Special Programs Administration has determined: *May pose an unreasonable risk to health and safety or property when being transported.* Here are a few that are used in MDT.

Column 2 Hazardous Materials Description and Proper Shipping Names	C-3 HM Class or Div	C-4 ID no.	C-5 Pack- ing group	Column 6 Labels Required
Acetylene	2.1	UN1001		FLAMMABLE GAS
Asphalt, at or above its flashpoint	3	NA1999	III	FLAMMABLE LIQUID
Benzene	3	UN1114	II	FLAMMABLE LIQUID
Calcium Chloride	5.1	UN1453	II	OXIDIZER
Diesel	3	NA1993	III	
Hydrated Lime				
Mercury	8	UN2809	III	CORROSIVE
Oxygen	2.2	UN1072		NONFLAMMABLE GAS, OXIDIZER
Paint	8	UN3066	II	CORROSIVE
Propane	2.1	UN1978		FLAMMABLE GAS
Stoddard Solvent- Toulene	3	UN1294	III	FLAMMABLE LIQUID

The Hazardous Materials Table identifies the requirements that apply to each shipment of a hazardous material. The table will help the user identify-

- ✓ HM description and proper shipping names
- ✓ Hazard class, identification number, and packing group
- ✓ Required labels
- ✓ Special provisions

A. Information in the Hazardous Material Table

Not all the columns apply to our operation. The columns that will be used in this training are 2, 3, 4, 5 and 6. An explanation for these columns is given for your information.

Column 1-Symbols

- +** fixes proper shipping name, hazard class and packing group without regard to whether the material meets that class, packing group or other hazard class.
- A** applies to materials offered or intended for transportation by aircraft.
- D** identifies proper shipping names for describing materials for domestic transportation
- W** applies to materials which will be transported by vessel.

Column 2-Hazmat Description and Proper Shipping Names

This column list those materials which are designated hazardous. Use column 2 to find the proper shipping name of the hazardous material to be shipped or the name that most accurately describes the material. Proper shipping names appear in Roman Type not italics.

Column 3-Hazard Class/Division

Designate the hazard class or division of each proper shipping name or the word **Forbidden**. If Forbidden, the material may not be transported unless diluted, stabilized, or incorporated in a device and classed according to definitions in Hazardous Materials Regulations.

Column 4-Identification Numbers

Contains the identification number assigned to each proper shipping name.

UN indicates that the material is appropriate for international and domestic transportation.

NA indicates that the material is appropriate for domestic and Canadian transport only.

Column 5-Packing Group

Packing groups are assigned according to their proper shipping name and hazard class and indicate the degree of danger the materials presents.

Packing Group

I-Great Danger

II-Medium Danger

III-Minor Danger

Column 6-Labels

Hazard warning label conforming to the hazard class (column 3) and the proper shipping name (column 2) are required unless the item is exempt from labeling.

Column 7-Special Provisions

Identifies special provisions for transporting.

Column 8-Packaging Authorizations

This column contains three types of packaging authorizations: exceptions, non-bulk packaging, and bulk packaging.

Column 9-Quantity Limitations**Column 10-Vessel Stowage Requirements****3. Shipping Papers**

Whenever a hazardous material is transported, its description must appear on the shipping papers.

Complete instructions for shipping papers appear in the Hazardous Materials Regulations, Part 172, Subpart C: Shipping Papers.

Shipping Paper

Container Type	HM	Basic Description	Total Quantity	Weight
TT	RQ	Cutback Asphalt, 3, NA 1999, PG III, Flammable Liquid	300 gal.	
		Farmers Union Exchange-Phone-(406) 628-4518		

The shipping paper description must adhere to the following requirements:
A basic shipping description must include proper shipping name, hazard class or division from column 3, identification number from column 4, packing group, and total quantity.

1. If a hazardous material and non-hazardous material are described on the same shipping paper, the hazardous materials must be listed first, shown in contrasting color, identified with an X or RQ before the proper shipping name in the column marked HM.
2. Must be able to read the entry.
3. The description may not include codes or abbreviations.
4. Any additional information must follow the basic description.
5. Must contain the name of the shipper.
6. Shipping paper must show an emergency response telephone number.
7. Shipping papers must contain shipper's certification.

4. Placards

Hazmat placards are similar to the shape, color, and design of hazmat warning labels. The purpose of placards is to alert the public to potential dangers and to guide emergency personnel response to hazmat incidents. (See placards are shown on p. VIII of Emergency Response Book. The list of DOT Hazardous Materials Classification are on the last page of this section.

7. Performance Oriented Packaging

The proper packaging of hazardous materials is crucial to the safety of everyone involved in their handling and transport. Each hazmat package must be designated and manufactured so that when it is filled to its limit, closed, and under normal transportation conditions:

1. The hazardous materials will not be released from the package.
2. The impact, resistance, and strength of package will not be changed due to temperature variations.
3. Gases/vapors will not effect the packaging.

Packages for hazmat materials must be properly marked with ID and special requirements, tested and approved prior to use, and have a manufacturer's mark on each package.

8. Proper Loading and Securement Techniques

Specific information on loading and storing hazardous materials is located in Hazardous Materials Regulations Part 17.

If your work involves loading and securing hazardous materials, you must be aware of the following:

A. Separation distances are established for transporting radioactive materials and are required for people and cargo compartment dividing petitions.

B. Segregation of Hazardous materials-Certain hazardous materials cannot be carried on the same load. A Segregation Table provides a reference for segregating certain hazardous materials.

Blank space Materials can be loaded together

Letter X Materials can not be loaded together

Dot • Explosives can not be loaded together

Letter 0 Materials can not be loaded together unless separated by four feet and must be at least 10 centimeters off the floor.
Segregation Table is on next page.

Segregation Table for Hazardous Materials

Class/Division	1.1 1.2	1.3	1.4	1.5	1.6	2.1	2.2	2.3 A	2.3 B	3	4.1	4.2	4.3	5.1	5.2	6.1	7	8
Explosives-1.1,1.2	•	•	•	•	•	X	X	X	X	X	X	X	X	X	X	X	X	X
Explosives-1.3	•	•	•	•	•	X		X	X	X		X	X	X	X	X		X
Explosives-1.4	•	•	•	•	•	0		0	0	0		0				0		0
Explosives-1.5	•	•	•	•	•	X	X	X	X	X	X	X	X	X	X	X	X	X
Explosives-1.6	•	•	•	•	•													
Flammable gas-2.1	X	X	0	X				X	0							0	0	
Non-toxic, non- flammable gases-2.2	X			X														
Poisonous Gas A-2.3	X	X	0	X		X				X	X	X	X	X	X			X
Poisonous Gas B-2.3	X	X	0	X		0				0	0	0	0	0	0			0
Flammable Liquids-3	X	X	0	X				X	0					0		X		

Class/Division	1.1 1.2	1.3	1.4	1.5	1.6	2.1	2.2	2.3 A	2.3 B	3	4.1	4.2	4.3	5.1	5.2	6.1	7	8
Flammable Solids-4.1	X			X				X	0							X		0
Spontaneously combustible materials-4.2	X	X	0	X				X	0							X		X
Dangerous when wet materials-4.3	X	X		X				X	0							X		0
Oxidizers-5.1	X	X		X				X	0	0						X		0
Organic peroxides- 5.2	X	X		X				X	0							X		0
Poisonous liquids-6.1	X	X	0	X		0				X	X	X	X	X	X			X
Radioactive materials-7	X			X		0												
Corrosive liquids-8	X	X	0	X				X	0		0	X	0	0	0	X		

DOT Hazardous Material Classifications

Hazard Class or Division	Label Name	Placard Name
1.1	Explosive 1.1	Explosives 1.1
1.2	Explosive 1.2	Explosives 1.2
1.3	Explosive 1.3	Explosives 1.3
1.4	Explosive 1.4	Explosives 1.4
1.5	Explosive 1.5	Explosives 1.5
1.6	Explosive 1.6	Explosives 1.6
2.1	Flammable Gas	Flammable Gas
2.2	Non-Flammable Gas	Nonflammable Gas
2.3	Poison Gas	Poison Gas
3	Flammable Liquids	Flammable
	Combustible liquids	Combustible
4.1	Flammable Solids	Flammable Solid
4.2	Spontaneously Combustible	Flammable Solid
4.3	Dangerous when Wet	Dangerous when Wet
5.1	Oxidizer	Oxidizer
5.2	Organic Peroxide	Organic Peroxide
6.1	Poison	Poison
6.2	Infectious substance	
7	Radioactive	Radioactive
8	Corrosive	Corrosive
9	Class 9	Class 9

General Awareness Test

Directions: Read each statement carefully and circle the response that best answers the question.

1. Containers for hazardous materials must be-
 - A. Leak-proof, marked with ID numbers, and tested to use.
 - B. Leak proof, color-coded, and marked with ID numbers.
 - C. Color-coded, and marked with ID numbers.
 - D. None of the above.
2. All emergency information regarding a hazardous material must include-
 - A. Emergency telephone number.
 - B. Be accessible to workers.
 - C. Be printed in English and available at a location away from the hazmat package.
 - D. All of the above.
3. A hazmat employee is defined as one who-
 - A. Works for the Montana Department of Transportation.
 - B. Has a direct affect on the safe transportation of hazardous materials.
 - C. Works in the loading and storage of the department.
 - D. Works in the trucking industry.
4. In the Hazardous Materials Table, the packing group is an indication of:
 - A. The size of the hazmat packaging.
 - B. The weight of the hazmat packaging.
 - C. The degree of danger the material presents.
 - D. The size and the weight of the hazmat packaging.
5. The proper entry of hazardous material on a shipping paper must show-
 - A. The emergency response phone number, the name of the shipper, the basic description of the material and the ID number.
 - B. Only the description.
 - C. Only the shipping name and ID number.
 - D. Description and emergency response phone number.
6. Placards must be placed-
 - A. One each side and each end of the hazardous material package.
 - B. On each side and each end of the transport vehicle.
 - C. On the top of the hazardous material package.
 - D. On the rear of the transport vehicle.
7. The NA in the identification number refer to
 - A. Not applicable.
 - B. The fact that the material is appropriate for domestic and Canadian transport.
 - C. The fact that the material is appropriate for international and domestic transportation.
 - D. The fact that the material can't be transported.

8. Placards are designed
- A. To correspond to labels.
 - B. Colored coded so hazards can be quickly recognized.
 - C. With hazard class and division.
 - D. All of the above.
9. What class number is diesel?
- A. 1
 - B. 2
 - C. 3
 - D. 7
10. Which of the following can not be loaded together?
- A. Flammable liquid, flammable gas
 - B. Flammable gas, oxidizers
 - C. Flammable gas, explosive 1.6
 - D. Explosives 1.5, flammable solids

Safety Training

1. Introduction

Safety training is intended for any hazmat employee who handles or transports packages of hazardous materials and could therefore be potentially exposed to such materials in an accident/incident.

This training is a basic safety training to those with limited emergency responsibilities.

Goal

To ensure that each hazmat worker knows what to do in the event of a hazardous materials incident/accident.

Objectives

1. Participants will demonstrate how to use the Emergency Response Guidebook.
2. Participants will demonstrate knowledge of MDT Emergency Response.

2. Dealing with a Hazmat Emergency

Dealing with a hazmat emergency is crucial. At MDT, we have chances for exposure within our facilities and out on the road. This training is in no way intended to meet the requirements of hazmat employees whose primary function is emergency response. It is simply meant to provide basic safety training to those with limited emergency responsibilities.

If you are exposed to hazardous material incident/accident during the course of your work, you may need to know the following about emergency response:

- A. Before you do anything about an hazardous material incident, you need to know the basic description and proper shipping name of hazardous material.
- B. You need the following information about the hazardous materials involved:
 - immediate hazards to health
 - risks of fire and exposure
 - immediate precautions needed in case of an incident/accident
 - who to contact in case of an incident/accident
 - how to clear the area
 - preliminary first aid including how to use a fire extinguisher
 - emergency response number

C. This information must be available away from the package containing the hazardous materials. You can find this information from:

- Shipping papers
- Emergency Response Guidebook
- Material Safety Data Sheet

3. MDT Emergency Response

The red cards indicate the guidelines for establishing procedures for first responders. The following are the procedures for hazardous materials initial emergency response.

MONTANA DEPARTMENT OF TRANSPORTATION PROCEDURES FOR HAZARDOUS MATERIAL SITE EVALUATION & RESPONSE INITIATION

The following guidelines have been established to protect all employees in the event of hazardous material spill incident:

1. Secure the site; control traffic.
2. Notify the nearest area office; give location.
3. Protect yourself, use a safe approach.
 - Approach from upwind, if possible.
 - Do not walk in or touch any spilled material.
 - Avoid inhaling fumes, smoke or vapors.
 - Do not assume that no noticeable smell indicates safety.
4. Identify the hazard if possible.
 - Relay information to area office.
 - Ask yourself:
 - Is rescue your immediate problem?
 - Is rescue really possible with the resources you have?
5. Request further aid and assistance from area office.
6. Enter the site only when you know enough and have the resources to do so safely.
7. Area office will:
 - Notify the L.E.P.C. (Local Emergency Planning Committee) phone _____
 - Notify S.E.R.C. (State Emergency Response Commission) State D.E.S. (Disaster Emergency Services) 444-6911.
 - Notify Chief Maintenance Engineer 444-6158.
 - Continuously update L.E.P.C./incident commander, S.E.R.C. State D.E.S. and Chief Maintenance Engineer.
8. Chief Maintenance Engineer will:
 - Notify Director.

- Continuously update the Director.

9. On-Scene coordinator will;

- Coordinate State agency response.
- Coordinate with local incident commander.
- Assume control of hazardous material incident until relieved by local government.

It is important the you follow the Hazardous Materials Checklist, the L.E.P.C. and S.E.R.C. State D.E.S. will request this information from the area office when they are called.

4. Emergency Response Guidebook

Our workers have the potential of being exposed to hazardous materials during a hazmat incident/accident within the work place and on the road.

The Emergency Response Guide is an excellent tool for guiding actions in a haz mat emergency.

Look at page i in the guidebook. The first statement in that book is bolded and underlined.

RESIST RUSHING IN!
APPROACH INCIDENT FROM UPWIND
STAY CLEAR OF ALL SPILLS, VAPORS, FUMES AND
SMOKE

5. How to Use the Emergency Response Guidebook

A. The guide is divided into color-coded parts:

Yellow pages: list hazardous materials by ID number

Blue pages: list hazardous materials alphabetically

Orange pages: guide numbers for emergency response information

Green pages: initial isolation and protective action distances

B. Using the guide:

1. Identify the material

a. Find one of the following:

✓ 4 digit ID number on a placard or orange panel

✓ 4 digit ID number (list after UN or NA) on a shipping paper or package

✓ name of material on a shipping paper, placard, or package

b. If you cannot locate the ID number or name:

✓ try to find a placard like it in the table of placards. Refer to the two digit guidebook

C. If you cannot find any reference to a guide, but you believe the incident involves a hazardous material, turn to Guide 11 and use that until more information is available.

D. Find the material's 2 digit guide number using:

- a. yellow ID section
- b. blue name section

Guide numbers for explosive hazardous materials are printed in the middle of the first page of the guide.

If an entry is highlighted in yellow or blue section turn to green section: **Initial Isolation and Protective Active Distances** for information.

Group Activity 2

List the hazardous materials you come in contact with during your work and provide the guide number for each.

Hazardous Material

Guide Number

6. Protective Equipment

For the hazardous materials above what protective equipment do you need to have when working with each of these materials?

7. Hazardous Materials Considerations

When coming across an accident as a first responder and you don't see any placards, assume there might be hazardous material involved.

- A. You, as the first responder, are hampered by limited knowledge.
- B. There are no routine incidents.
- C. Chemical exposure can have lasting effects on your health.
- D. Hazardous materials are everywhere.

Example: Gasoline is common at transportation incidents. One gallon, when vaporized and ignited, has the explosive heat of 20 sticks of dynamite.

E. Some common products are deadly when mixed.

Example: Semi hauling grocery supplies will not be placarded, but could contain lethal combinations such as ammonia and chlorine bleach.

8. Detecting the Presence of Hazardous Materials.

Detecting the presence of a hazardous material is the first step in the response sequence.

A. Interpreting outward warning signs

Observing any of these outward warning signs should serve as an immediate **RED FLAG** to emergency responders assessing the incident scene.

- ✓ collapsed victims
- ✓ people running from a hazardous area
- ✓ birds and insects dead around site
- ✓ hissing sound
- ✓ flames or smoke

B. Searching for detection clues.

Be alert to clues that indicate the likely presence of a hazardous material.

1. Container shapes.

What type of containers/vehicles would you suspect would carry hazardous materials?

2. Marking & color

Colors refers to colored marking systems like the National Fire Protection Association's Standard 704-blue for health, red for flammability, and yellow for reactivity.

3. Placards & labels

Placards are found on front rear and side of containers and vehicle. Labels are on containers.

Color of placard indicates the major hazard class. Single digit on some placard indicates the hazardous class. UN numbers indicate a particular hazardous material. Placards also have symbols which indicates hazardous materials.

Safety Test

You will need to use the Emergency Response Guidebook for parts of the test.

1. The primary goal of safety training is to:
 - A. Prevent you from being injured or allowing others and the environment to be injured.
 - B. Comply with state and federal law.
 - C. Identify what hazardous materials are and the risks associated with them.
 - D. Identify the potential outcomes of incidents involving hazardous materials.
2. All emergency information regarding a hazardous material must:
 - A. Contain an emergency telephone number.
 - B. Be accessible to workers.
 - C. Be printed in English and available away from the hazmat package.
 - D. All of the above.
3. When dealing with vapors, fumes, and smoke:
 - A. Stay clear only if you know the material is hazardous.
 - B. Stay clear and assume the material is hazardous.
 - C. Approach slowly after covering your mouth and nose.
 - D. Approach slowly after calling for assistance.
4. The orange pages of the Emergency Response Guidebook contain:
 - A. A listing of hazardous materials by ID number.
 - B. An alphabetical listing of hazardous materials.
 - C. Initial isolation and protective action distances.
 - D. Emergency response information.
5. If an entry is highlighted you should:
 - A. Be prepared to leave the area immediately.
 - B. Turn to the orange pages for emergency response information.
 - C. Turn to green pages: initial isolation and protective action distances.
 - D. No material is highlighted.
6. At a minimum, safety training must include:
 - A. How to isolate a spill.
 - B. Knowing whom to call in case of a hazmat emergency.
 - C. How to use the Emergency Response Guidebook.
 - D. Both B and C.
7. If you cannot find either the ID number or name of a spilled material that you believe is hazardous:
 - A. Use Guide 11 until you receive more information.
 - B. Take no action until you receive more information.
 - C. Leave the area immediately.
 - D. Select any of the guide numbers used for explosives.

8. The green pages of the Emergency Response Guide provide:
- A listing of hazardous materials by ID number.
 - An alphabetical listing of hazardous materials.
 - Initial isolation and protective action distances.
 - Emergency response information.
9. You find a material's 2-digit guide number in the Emergency Response Guidebook by:
- Using the yellow pages (ID index).
 - Using the blue pages (name index).
 - Looking on the shipping paper or MSDS
 - Either A or B.
10. N.O.S. means:
- Not an organic substance.
 - Not otherwise specified.
 - Not other wise safe.
 - No other signs.
11. The most dangerous clue that emergency responders can utilize to attempt to detect and identify hazardous materials is:
- Their senses.
 - The container markings.
 - Shipping papers.
 - Occupancy or location.
12. Which emergency action guide should the emergency responders use for the material identified in these shipping papers below?
- 12
 - 19
 - 26
 - 69

033V1	1	RQ	Ethylene Oxide		
			Flammable gas		
			UN 1040		
			Emergency contact: (800) 424-9300		

13. The initial isolation distance for a spill or leak from the container (UN 2199) if there is no fire would be how far in each direction?
- 500 feet
 - 1500 feet
 - 0.2 miles
 - 0.5 miles

14. On placard feature most visible from a distance is the-
- A. Color
 - B. Symbol
 - C. Hazard class
 - D. Hazard class number
15. First responders should initially attempt to detect the presence of hazardous materials at an incident by-
- A. Calling Chemtrec.
 - B. Looking at the scene from a distance.
 - C. Driving or walking into the incident and looking for outward warning signs.
 - D. Locating the shipping papers.

Function Specific Training

1. Introduction

Function specific training is intended to teach the skills needed for a specific haz mat job assignment.

Objectives

Increase the awareness of safety considerations and regulatory requirements, thereby reducing the occurrence of hazardous materials incidents caused by human error.

2. Material Safety Data Sheets

OSHA Hazardous Communications Standards require that each employer provides their employees with information on what hazardous materials you are working with, why it's hazardous, and how to protect yourself from potential hazards.

A. Identify And Hazardous Ingredients

There are different MSDS formats, but OSHA requires that certain information on the MSDS. This section covers the information required on the MSDS. Each MSDS needs to have-

- the name of the chemical
- name and address of company providing the chemical
- manufacture's phone number to call for advice in case of emergency

Many chemicals have more than one hazardous ingredient, and the second section of the MSDS tells you exactly what they are. It also tells you what level of exposure to each ingredient is considered safe.

B. Physical and Chemical Characteristics

This section of the MSDS data sheet covers physical and chemical characteristics of the substance. This information will help you avoid trouble. It includes normal odor, so you can avoid abnormal odor which might be dangerous. It includes characteristics such as *boiling point, melting point, vapor pressure and density, and solubility in water.*

C. Fire and Explosion Data

The MSDS provides information on how to prevent fires and explosion. This section tells the chemical's *flash point, the lowest temperature at which a chemical will ignite.* If a substance has a very low flash point, as gasoline does, you know you have to take steps to prevent fires or explosions even in freezing weather.

If there is a fire, this section of the MSDS also tells you whether to use water, CO₂, or foam to put it out.

D. Reactivity Data

The next MSDS section covers reactivity, and explains what happens when a chemical mixes with a substance (such as air, water, or another chemical) that can cause a dangerous reaction. Some chemicals will burn, explode, or release toxic vapors when they react with other specific substances. This sections will tell you to

keep a chemical that's highly reactive to water stored in a closed dry drums.

E. Health Hazards

This section covers how the chemicals could effect you, if you are overexposed to them. Chemicals listed as **toxic** could be poisonous to inner organs such as the kidney. **Corrosives** will burn the skin or the eyes. **Carcinogens** are chemicals suspected of causing cancer.

This section also covers the long-term effects and the short-term effects that is created by immediate exposure. The health hazards section tells how you can be exposed such as by swallowing, inhaling, contact with the skin or eyes. It also covers the symptoms of exposure. This could mean reactions such as headaches, dizziness, or a skin rash. The MSDS describes first aid procedures for exposure.

F. Precaution for Safe Handling and Use

The MSDS also gives directions for safe handling and use. It also includes how to store the chemical properly. The MSDS gives information on how to clean up spills and dispose of the waste it creates. The MSDS and a contingency plan can prevent spills from getting out of hand.

G. Control Measures

The last section of the MSDS include the *personal protective equipment* you should wear to protect yourself from chemical hazards. The MSDS will tell you to wear gloves, respirators, or protective suit, whatever you need to be safe.

This section also explains proper hygiene procedures to follow, such as washing your hands or clothes after working with the chemical. This can help reduce your exposure and prevent health hazards.

Group Activity III

Using the material safety data sheets for Stoddard Solvents (MSDS at the end of the manual), complete the following questions:

1. What type of hazards does this material have?
2. What would be the first aid procedures if someone was injured with this material?

3. What protective equipment needs to be used with this material?
4. How should the material be stored?
5. What is flash point for this material? What does this mean for you as a mechanic?
6. What does chemical reactivity mean? What is the chemical reactivity of this material?
7. In reviewing the MSDS, how will you personally handle this material safely?
8. You are transferring a small amount of this material into another container. What information will you put on the container?

3. Labels

Hazardous materials warning labels are designed and color-coded so that the hazards can be quickly recognized. Warning labels correspond to the placards that must appear on each bulk packaging, freight container, unit load device, and transport vehicle. The labels must include both the hazard class and the division of hazard according to the Hazardous Materials Table. Unless exempt, all hazardous material packages must be labeled.

A. Labeling of Hazardous Materials

Labels on chemical containers are your guide to safety. Labels on a chemical container alert you to the chemicals' hazards and information on how to protect yourself. Used in combination with material safety data sheets, labels give you the information and guidance you need to stay safe and healthy when working with hazardous chemicals. There are a number of different labeling systems.

B. NFPA Labels

The National Fire Protection Association, for example, uses colors, numbers and abbreviation to deliver a safety message. When you look at NFPA label, you know what the chemical is, what its hazards are, and what hazards require the most care and caution.

In this system, the following colors mean-

- **Red means fire hazard**
- **Yellow means reactivity hazard**
- **Blue is a health hazard**

The system uses numbers to tell you how dangerous the hazard is. The number "1" means slightly hazardous, while the number "4" means deadly.

The white space on the label gives you specific information about special hazards.

- | | |
|--------|---|
| ✓ OX | -chemical which is an oxidizer that should be kept away from flammable substances |
| ✓ ACID | -acid-corrosive |
| ✓ COR | -chemical which is corrosive |
| ✓ W | -chemical which should not be used with water |
| ✓ | -radioactive |

C. Color Bar Labels

Another labeling system uses colored bars with the same code system as the NFPA. The color bar labels also give a section which tell what personal protective gear to wear when working with chemicals. Though this information is available on MSDS, it is useful to know on the spot.

D. Other Labels

Labels often use a combination of words and symbols to get their message across. They start with the name of the chemical and the manufacture's name, address, and phone number if you need specific information in case of emergency.

The most important information on the label is the hazard warning: flammable, poisonous. The label uses key words to tell you the degree of hazard:

- **Danger-chemical can cause immediate serious injury or death**
- **Warning-potentially serious injury or death**
- **Caution-potentially moderate injury**

Chemical labels must also tell people who work with the chemicals exactly what kinds of health hazards the chemical presents. Words for health hazards include-

- **Toxic-poisonous chemicals**
- **Carcinogen-chemical that could cause cancer**
- **Corrosive-chemical can burn the skin or eyes on contact, lung, and nose if inhaled**

E. Other Information on Label

Labels may also give first-aid procedures to follow when exposed to the chemical. In many cases, the degree of injury can be reduced.

Labels also provide information on storing and handling the chemical. Example: Use only in well-ventilated area.

F. Using Labels

To have chemical information right at hand-

- ✓ Make sure that every chemical you use carries a label.
- ✓ Replace any label that comes off or that can't be read.
- ✓ When transferring a chemical into a smaller container, label the container so that everyone knows what's inside.

4. Compressed Gases

Compressed gases are defined as any material that when enclosed in a container has an absolute pressure exceeding 40 psi at 70°F. For flammable gases, the figure is 25 psig at 100°F. Compressed gases may be further subdivided into pressurized and liquefied.

Pressurized gases are those that when compressed in a cylinder do not liquefy because their boiling points are very low. Example: oxygen, nitrogen, argon.

Liquefied gases exist in liquid-vapor relationship and have a boiling point range from

32° to -150°F. Liquefied petroleum gases are, as the name implies, a petroleum product.

LPG is applied to that segment of the gas family which is a vapor at atmospheric pressure and normal temperature, but under conditions of moderate pressure can be changed to liquid. Propane falls into this category. As a liquid, propane takes as little as 1/270th of the space it needs as a gas. One gallon of liquid propane at 60°F will produce 36 cubic feet of gas.

LPG gas when stored as a liquid in a closed steel container will exert a pressure on the inside of the container by reason of boiling and producing gas. The liquid is continually striving to reach a point of equilibrium relative to the temperature of the atmosphere surrounding the container. As the temperature of the liquid goes down, the pressure goes down.

LP gas storage tanks, whether mobile or stationary, are never completely filled. Approximately 20 percent of the gross capacity of the tank is used as a space for vapor. This is to allow for expansion of the liquid as well as a space for reserve gas for utilization. In a tank liquid full, only a slight temperature rise is needed to produce a relatively high hydrostatic pressure, causing the relief valve to open and discharge liquid.

5. BLEVE

Flammable, liquefied, and cryogenic gases present an additional type of explosion potential. When one of these gas containers fails, the gas vaporizes and expands very rapidly. The resulting explosion is called BLEVE "Boiling liquid expanding vapor explosions"

Direct flame impinges on a propane tank causing structural weakening and large internal pressure within the tank. Eventually, the tank could crack and spill liquid or vapors, rupture violently sending pieces of the tank thousands of feet away and releasing the burning contents of the tank in a fraction of a second. If the conditions for BLEVE are right, get away immediately from the site.

6. Fire Extinguisher

A. The index has charts on types of fires and type of extinguisher to use with each type of fire. MDT uses dry chemical fire extinguisher, ABC. The ingredients in dry chemical fire extinguisher are nontoxic. However, discharging large quantities may cause temporary breathing difficulties and may interfere with you ability to see what's going on.

When fighting a small fire, hold the nozzle as close to the base of the flames as you can without burning yourself. Shoot short sweeping bursts of the chemical across the flame base. Remember that a fire extinguisher is for use on fires that have just begun, not on raging inferno. If it's shooting in the air, don't even try to fight it. Clear the area so you won't be burned.

From Safety Management-Number 374

Practice beforehand makes panic less likely during emergency. Proper operation of for

extinguisher are important. People don't realize the enormous pressure in a fire extinguisher- normally 125 pounds of pressure. As a result, when people use an extinguisher on a fire, they often wind up blowing the fire back on themselves and may create an even bigger blaze. An example of this was an employee who was trying to help, pulled the fire extinguisher off the wall and sprayed it directly on the fire. The fire blew back at him and ignited nearby curtains. The injuries the employee sustained and the additional fire damage might have been minimized had the employee been trained in proper extinguisher handling.

B. Classes of Fires

Class A-Fires that occur in ordinary combustible materials such as rags, wood, and rubbish.

Class B-Fires that occur with flammable liquids.

Class C-Fires that occur in electrical equipment such as motors.

Class D-Fires that occur with combustible metals such as magnesium.

8. Welding

See MDT Safety Manual for protective equipment and safety procedures.

Function-Specific Test

1. What does the word **flash point** mean?
 - A. The temperature that the material will ignite and burn by itself.
 - B. The boiling point of water.
 - C. The temperature of 78° F.
 - D. None of the above.
2. Information on flash point of road oil emulsions can be found:
 - A. On the tank.
 - B. In the material safety data sheet.
 - C. From the field maintenance supervisory.
 - D. Don't have to worry about flash points with emulsions.
3. You can be exposed to a chemical by:
 - A. Swallowing it, inhaling it, absorbing it through the skin, or getting it in your eyes.
 - B. Reading the MSDS.
 - C. Working for a chemical company.
 - D. All of the above.
4. MSDS (Material Safety Data Sheets) should be kept:
 - A. In a locked file cabinet.
 - B. In a location convenient to anyone who uses chemicals.
 - C. At the chemical manufacturer's facility.
 - D. In the MDT safety office in Helena.
5. Typical protective equipment for chemical safety includes:
 - A. Raincoats and umbrellas.
 - B. Hard hats and ear plugs.
 - C. Protective gloves, safety goggles, and respirators.
 - D. Shorts, sandals, and muscle shirt.
6. A chemical with a low flash point can:
 - A. Only catch fire when temperatures are very hot.
 - B. Cause skin rashes.
 - C. Catch fire at low temperatures.
 - D. Are stable around flames.
7. The time to check a chemical container label is:
 - A. Before you put the container away.
 - B. While meeting legal requirements.
 - C. Before you start any job involving the chemical.
 - D. After you've been exposed to the chemical.
8. On National Fire Protection Association labels, red means fire hazard and
 - A. Green means health hazard and purple means explosion hazard.
 - B. White means no hazard.
 - C. Blue means health hazard.
 - D. Yellow means flammable/combustible.

9. When numbers are used on a label to indicate the degree of hazard:
- A. 1 is slightly hazardous and 4 is deadly.
 - B. 4 is slightly hazardous and 1 is deadly.
 - C. 1 is slightly hazardous and 10 is deadly.
 - D. Number system refers to environmental issues.
10. **Danger** on a label means the chemical can cause:
- A. Headaches.
 - B. Potentially moderate injuries.
 - C. Immediate serious injury or death.
 - D. Slight burns to the skin.
11. The word **toxic** on a label means:
- A. The chemical can poison you.
 - B. The chemical can catch fire.
 - C. Don't mix the chemical with water.
 - D. The chemical will burn your skin.
12. When you transfer a chemical from a large to a small container:
- A. Do the job in a clean storage area.
 - B. Tell other workers what's in the small container.
 - C. Label the small container.
 - D. Don't worry about the chemicals.
13. What type of fire extinguisher would you use with a flammable liquid such as gasoline, oil, grease, paint, and thinners?
- A. Class A
 - B. Class B
 - C. Class C
 - D. Class D
14. The MSDS section on reactivity describes:
- A. The chemical's reaction to other chemicals, air, or water.
 - B. The chemical's reaction to being kept in storage too long.
 - C. Your skin's reaction to the chemical.
 - D. Hazardous ingredients and permissible exposure levels.
15. Hazmat warning labels list-
- A. The contents, weight, and destination of the hazmat package.
 - B. The description, weight and destination of the hazmat package.
 - C. The correct class and division of hazard of the hazmat package.
 - D. Warning labels are color-coded only.
16. Use a fire extinguisher:
- A. At the beginning of a fire.
 - B. When the fire is a shooting inferno.
 - C. When the tar pot/crack sealer is about to blow.
 - D. All of the above.

17. You can get information on the materials you use from-
- A. Shipping papers.
 - B. Emergency Response Guidebook.
 - C. Material Safety Data Sheet.
 - D. All of the above.

Using the MSDS for stoddard solvent, answer the following questions:

18. Which of the following health hazards could stoddard solvents cause?
- A. Cancer
 - B. Birth defect
 - C. Eye, nose, and throat irritation
 - D. Severe skin irritation
19. The flashpoint of stoddard solvent is
- A. 102°-140°
 - B. 70°-80°
 - C. 212°
 - D. Don't have to worry about flashpoint
20. According to the National Fire Protective Association Index, which of the following categories should be of greatest concern:
- A. Health
 - B. Fire
 - C. Reactivity
 - D. No hazards whatsoever.
21. Which of the following protective equipment should you wear when working with stoddard solvent. (Less concentration than 3500mg)
- A. Respirator
 - B. Goggles
 - C. Gloves
 - D. Face shield
22. Which of the following hygiene standards should you follow when working with stoddard solvents?
- A. Don't smoke, eat, or drink when working with solvents.
 - B. Remove contaminated clothing promptly.
 - C. Launder contaminated clothes separately.
 - D. All of the above.
23. Where can stoddard solvent be stored?
- A. In tightly closed containers in a cool area.
 - B. Next to other petroleum products
 - C. Next to a generator.
 - D. None of the above.
24. What type of fire extinguisher would you use if the stoddard solvent catches fire?
- A. Class A
 - B. Class B
 - C. Class C
 - D. All the above

* * * * *
 * C H E M I N F O *
 *
 * Canadian Centre for Occupational Health and Safety *
 * * * * *

*** IDENTIFICATION ***

RECORD NUMBER : 7
 CCOHS CHEMICAL NAME : Stoddard solvent
 SYNONYM(S) :
 * Mineral spirits
 * White spirits
 * High flash naphtha
 * Safety solvent naphtha
 CAS REGISTRY NUMBER : 8052-41-3
 PIN - UN/NA NUMBER(S) : 1256
 RTECS NUMBER(S) : WJ8925000
 CHEMICAL FAMILY : Petroleum hydrocarbon distillate
 STRUCTURAL FORMULA : Not applicable
 LAST REVISION DATE : 1991-11-28

*** DESCRIPTION ***

APPEARANCE AND ODOUR : Colourless liquid with kerosene-like odour
 ODOUR THRESHOLD : About 1 ppm (5 mg/m3)
 WARNING PROPERTIES (ODOUR AND IRRITATION) :
 Fair - Odour usually detectable below exposure limit, but perception of odour may decline with continuing exposure.

COMPOSITION/PURITY :
 Aromatic (15-20%) and aliphatic (80-85%) hydrocarbons

USES AND OCCURRENCES :
 Solvent and thinner for paints, varnish and other coatings; drycleaning; manufacture of pesticides, cleaners and other aerosol products; cleaning and degreasing metal and leather; solvent in the textile industry; extraction of fats and oils; in rubber cements and polishes; and tackifying agent for rubber

*** HUMAN HEALTH HAZARD DATA ***

* EFFECTS OF SHORT-TERM (ACUTE) EXPOSURE *

INHALATION :
 Eye, nose and throat irritation, dizziness, headache, feelings of drunkenness, changes in memory and reaction time, convulsions and, at very high concentrations, unconsciousness and death

EYE CONTACT :
 Vapour can cause eye irritation. Contact with the liquid can cause reddening and swelling of the tissues around the eyes (conjunctivitis).

SKIN CONTACT :
 Drying of skin and mild irritation.

INGESTION :
 Similar to inhalation unless Stoddard solvent is taken into the lungs (aspirated) during ingestion or vomiting. Aspiration of small quantities can be fatal.

* EFFECTS OF LONG-TERM (CHRONIC) EXPOSURE *

HEALTH EFFECTS :

SKIN: Prolonged or repeated contact with liquid can result in drying and defatting of the skin and dermatitis
CARCINOGENICITY :
No evidence of carcinogenicity
1. ATOGENICITY AND EMBRYOTOXICITY :
No information available
MUTAGENICITY :
Test results negative
POTENTIAL FOR ACCUMULATION :
Does not accumulate

*** FIRST AID ***

INHALATION :

Remove source of contamination or move victim to fresh air. If breathing has stopped, properly trained personnel should begin artificial respiration or cardiopulmonary resuscitation (CPR) immediately. Obtain medical attention immediately.

EYE CONTACT :

Immediately flush the contaminated eye(s) with lukewarm, gently flowing water for 20 minutes, by the clock, holding the eyelid(s) open. Obtain medical attention immediately.

SKIN CONTACT :

As quickly as possible, flush contaminated area with lukewarm, gently running water for at least 10 minutes, by the clock. If available, non-abrasive soap or mild detergent may be used. If irritation persists, repeat flushing. Obtain medical advice immediately. Completely decontaminate clothing, shoes and leather goods before re-use or discard.

INGESTION :

Never give anything by mouth if victim is rapidly losing consciousness, or is unconscious or convulsing. Rinse mouth thoroughly with water. DO NOT INDUCE VOMITING. Have victim drink 8 to 10 ozs. (240 to 300 ml) of water to dilute material in stomach. If vomiting occurs naturally, have victim lean forward to reduce risk of aspiration. Repeat administration of water. Obtain medical attention immediately.

FIRST AID COMMENTS :

Provide general supportive measures (comfort, warmth, rest). Consult a physician and/or the nearest Poison Control Centre for all exposures except minor instances of inhalation or skin contact.

*** ANIMAL TOXICITY DATA ***

ANIMAL TOXICITY DATA :

Kidney damage in rats exposed to 190-330 ppm for 40 to 65 days Dogs exposed to 84 to 330 ppm for 6 hours per day, 5 days per week for 13 weeks showed no sign of kidney damage LCLo (rat, inhalation) 1,400 ppm/8 hours LCLo (cat, inhalation) 1,700 ppm/2.5 hours

*** OCCUPATIONAL EXPOSURE LIMITS ***

* THRESHOLD LIMIT VALUES (TLVS) / AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS (ACGIH) / 1991-92 *

TIME-WEIGHTED AVERAGE (TLV-TWA) : 100 ppm (525 mg/m3)

EXPOSURE LIMIT COMMENTS :

NOTE: Since the manner in which exposure limits are established, interpreted and implemented can vary among the jurisdictions, detailed information should be sought from the appropriate government agency in each jurisdiction

*** EXPOSURE CONTROL ***

- * Note: Exposure to this material can be controlled in many ways. The measures appropriate for a particular worksite depend on how this material is used and on the extent of exposure. Use this general information to help develop specific control measures. Ensure that control systems are properly designed and maintained. Comply with occupational, environmental, fire, and other applicable regulations. *

ENGINEERING CONTROLS :

General (dilution) ventilation normally adequate for small-scale use at room temperature. Local exhaust ventilation may be required with large-scale use or at elevated temperatures. Isolation or enclosure are preferred. Only spark-resistant equipment should be used.

* PERSONAL PROTECTIVE EQUIPMENT *

RESPIRATORY PROTECTION GUIDELINES :

NIOSH RECOMMENDATIONS FOR STODDARD SOLVENT CONCENTRATIONS IN AIR (2): UP TO 3500 mg/m³: SAR; or SCBA; or chemical cartridge respirator with organic vapour cartridge(s). UP TO 5900 mg/m³: Powered air-purifying respirator with organic vapour cartridge(s); or full-facepiece chemical cartridge respirator with organic vapour cartridge(s). UP TO 8750 mg/m³: SAR operated in a continuous-flow mode. UP TO 17500 mg/m³: Gas mask with organic vapour canister; or full-facepiece SCBA; or full-facepiece SAR. UP TO 29500 mg/m³: Positive pressure, full-facepiece SAR. EMERGENCY OR PLANNED ENTRY INTO UNKNOWN CONCENTRATIONS OR IDLH CONDITIONS: Positive pressure, full-facepiece SCBA; or positive pressure, full-facepiece SAR with an auxiliary positive pressure SCBA. ESCAPE: Gas mask with organic vapour canister; or escape-type SCBA. NOTE: The IDLH concentration for Stoddard solvent is 29500 mg/m³. NOTE: Substance reported to cause eye irritation or damage; may require eye protection. ABBREVIATIONS: SAR = supplied-air respirator; SCBA = self-contained breathing apparatus. IDLH = Immediately Dangerous to Life or Health. NOTE: In these recommendations, the IDLH concentration is defined as the maximum concentration which would not cause any escape-impairing symptoms or irreversible health effects to a person exposed for 30 minutes if the respirator failed. Recommendations apply only to NIOSH and MSHA (Mine Safety and Health Administration) approved respirators. Air-purifying respirators do not protect against oxygen-deficient atmospheres.

EYE/FACE PROTECTION :

Chemical goggles or face shields whenever there is a risk of splashing liquid in to the eyes.

SKIN PROTECTION :

Protective clothing (gloves, coveralls, boots, etc.) as needed to prevent skin contact with liquid

RESISTANCE OF MATERIALS FOR PROTECTIVE CLOTHING :

Neoprene, polyvinyl alcohol (PVA) or Buna-n rubber should provide adequate protection Stoddard solvent will attack some forms of plastics, rubbers, and coatings.

PERSONAL PROTECTION COMMENTS :

Contaminated clothing should be removed promptly and discarded or laundered separately. Smoking, eating and drinking should be forbidden in work areas

*** STORAGE AND HANDLING ***

STORAGE CONDITIONS :

Store in tightly closed containers in a cool area separate from normal work

areas. The storage area should have adequate independent ventilation and have no sources of heat or sparks such as electric motors. Approved safety solvent containers are preferred. Containers should be covered when not in use and should be stored in a fire-resistant, grounded cabinet. Use solvent-resistant materials in storage and handling areas

HANDLING :

Use Stoddard solvent in minimal quantities in designated areas with adequate ventilation and away from sources of heat or sparks. Metal containers should be grounded while material is being poured.

*** SPILL AND LEAK PROCEDURES ***

PRECAUTIONS :

Restrict access to area. Provide adequate ventilation, protective clothing and respirators. Remove all sources of heat or flame.

CLEANUP :

Stop flow if it can be done safely. Contain material. Collect into containers for recycling or absorb material on dry clay, sand, sawdust or other absorbent material for disposal.

*** DISPOSAL ***

DISPOSAL :

Dispose of in a designated landfill site or burn in an approved solvent burner. Notify environment agency in the event of any significant release of this material into the environment. Confirm disposal practices with environmental authorities.

*** FIRE AND EXPLOSION ***

FLASH POINT : 38.7 to 60 deg C (102 to 140 deg F) (Closed cup)

LOWER EXPLOSIVE LIMIT (LEL) : 0.8-0.9%

UPPER EXPLOSIVE LIMIT (UEL) : 6%

AUTOIGNITION TEMPERATURE :

226-260 deg C (440-500 deg F)

FIRE EXTINGUISHING AGENTS :

Carbon dioxide, dry chemical or "alcohol" foam

FIRE FIGHTING PROCEDURES :

Water spray can be used to extinguish fires involving Stoddard solvent since it can be cooled below its flash point

COMBUSTION (THERMAL DECOMPOSITION) PRODUCTS :

Carbon monoxide, carbon dioxide

* NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) HAZARD INDEX *

HEALTH : 0 - No hazard beyond that of ordinary combustible material

FIRE : 2 - Must be moderately heated before ignition will occur. Water spray can be used to cool Stoddard solvent below its flash point.

REACTIVITY : 0 - Normally stable

*** CHEMICAL REACTIVITY ***

STABILITY :

Normally stable

INCOMPATIBILITY - MATERIALS TO AVOID :

Strong oxidizing agents such as pure oxygen and liquid chlorine. Can attack some types of plastics, rubber and coatings

HAZARDOUS POLYMERIZATION : Does not occur

CORROSIVITY TO METALS :

Not corrosive

*** PHYSICAL PROPERTIES ***

CONVERSION FACTOR :

1 ppm = approx. 5 mg/m³

BOILING POINT : 150-200 deg C (301-392 deg F)

RELATIVE DENSITY (SPECIFIC GRAVITY) :

0.78 (water=1)

SOLUBILITY IN WATER :

Insoluble

SOLUBILITY IN OTHER LIQUIDS :

Miscible with benzene, ethanol, ether, chloroform, carbon tetrachloride and carbon disulfide

VAPOUR DENSITY : 5 (air=1)

VAPOUR PRESSURE : 2 mm Hg at 20 deg C

EVAPORATION RATE : Less than 1 (butyl acetate = 1)

*** WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS)
CLASSIFICATION ***

WHMIS INGREDIENT DISCLOSURE LIST : Confirmed A; Meets criteria for disclosure at 1% or greater

*** SELECTED BIBLIOGRAPHY ***

BIBLIOGRAPHY :

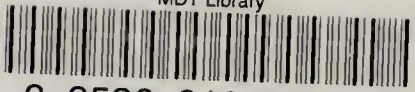
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* Information on chemicals contained in the CHEMINFO Database is drawn from a number of publicly available sources. The sources used are available on request.



MDT Library



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